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BOTANY.¹

"FORTUITOUS VARIATIONS IN EUPATORIUM" is the title of a paper recently read by Lester F. Ward before the Biological Society of Washington. This was an interesting and suggestive talk without being a set paper, and led to many remarks by members present. Several definitions of life have been given, but Prof. Ward considered the best to be "a general tendency on the part of living matter to multiply itself, to increase its quantity." This increase may take place in all directions, and often does take place in more than one. If it is not in all directions it is because of obstacles in the way, and the real increase is in the direction of least resistance. Many variations are noticeable in both plant and animal world, that are apparently of no special advantage to the organism. These chance or fortuitous variations can scarcely have been produced by natural selection, inasmuch as there is no appreciable or even imaginable value in them to the plant or animal. There are, to be sure, many which are of advantage, and these are acted upon and improved through natural selection. Darwin has said, though with many reservations, that only advantageous variations are selected and preserved. This does not seem to be at all universally the case. Quantity not quality is the end for which nature strives, and this may be considered an almost universal law. Perfection in structure is a secondary consideration, while increase of quantity is of primary importance. Prof. Ward did not believe all variations were of use to plants. The general tendency to vary in every direction is often counterbalanced by a determined progress in one direction, and this is generally useful. The specimens of Eupatorium were so arranged as to show the variations in the leaves, these being more prominent than in the flowers. The leaves varied from finely dissected to linear, then to lanceolate and ovate. One hybrid with intermediate leaves was shown. There are about four hundred species in the genus, most of them South American, one Australian, and about thirty North American. The fact of great variation in the plants was undoubted. The fact of these being all beneficial is not proved. How a sharp or an obtuse point, a serrate or a crenate margin to a leaf would be of any benefit to a plant in any situation he could not see. Therefore it seemed to him that many of these variations should be considered fortuitous or chance variations due to the general tendency of all life to increase in all directions and so adding to the total quantity of life in the world.

Dr. Merriam rather dissented from the views of Prof. Ward, he believing the variations to be generally of some slight advantage,

¹ Edited by Charles E. Bessey, Lincoln, Neb.

though to us it may be inappreciable. Dr. Goode mentioned analogous variation in fishes, especially in the number of scales, the real usefulness of a greater or less number of these being unknown. Some families (as the Cyprinidæ) are remarkable for these variations, while others (*e.g.* Perches) are noted for few or no variations, the species being very distinct in all their characters. Prof. Riley fully agreed with Prof. Ward. His studies of insects showed the existence of many variations which were undoubtedly useful, but at the same time many others the purpose of which was not in the least apparent.—*Jos. F. James.*

ASTER SHORTII.—Mr. E. S. Burgess has noted the occurrence of *Aster shortii* in the vicinity of Washington, D. C., a plant which had not been previously recorded. Prof. Ward in this connection mentioned he had found a species of *Lemna* new to the flora, and Dr. Vasey said he had found a species of *Festuca* not before known from the locality.—*Jos. F. James.*

“CAUSES OF CONFIGURATION OF TREES.”—Prof. Fernow, Chief of Division of Forestry, read a paper upon this subject. He exhibited several photographs of trees growing upon the sides of hills. The trunks of these formed nearly a right angle with the slope, and the branches were parallel with the slope. It was suggested by Prof. Ward that possibly the photographs represented an abnormal mode of growth, and that they were due to unusual conditions. It was also suggested that the peculiar direction of growth of branches was due to the cropping of cattle. Few of those present had ever seen trees similar to these, and most were inclined to the opinion that they represented something abnormal.—*Jos. F. James.*

THE NEED OF MAKING MEASUREMENTS IN MICROSCOPICAL WORK.—It is greatly to be desired that all workers with the microscope should make much more general use of the micrometer than is now the custom, particularly in botany. It is still a common thing to find descriptions of tissues accompanied by plates or figures with little to guide the reader as to the absolute size of the objects. In this the fathers sinned more than we, but we are by no means sinless, as may be seen by taking up almost any descriptive paper on botany. Cells, cell masses, filaments, hyphæ, spores of all kinds, pollen cells, etc., etc., should all be subjected to careful measurement. We may say that so many measurements are needless, but so the older botanists thought, greatly to our present discomfort.

In our botanical laboratories the student should be not only taught to make measurements of everything he studies, but the making of such measurements should be *a part of the study* of the object. No laboratory microscope should be used which does not have as one of its accessories always at hand an efficient micrometer.

Such a micrometer need not cost much. A simple disk of ruled glass dropped upon the diaphragm of the eye-piece will answer

every purpose in ordinary work. Or it may be a slip of glass which may be pushed through a slot in the eye-piece. Neither one ought to cost more than from one to two dollars, and ought to be afforded for every microscope in use in the laboratory.—*Charles E. Bessey.*

THE QUESTIONS OF NOMENCLATURE.—For some months a lively discussion has been going on in this country and England upon a few questions as to the proper interpretation of the laws relating to botanical nomenclature, the discussion in some cases broadening out so as to take in the inquiry as to the validity of certain laws, and the expediency of enacting new ones. “Shall we rigidly enforce the law of priority?” is the question which is causing the greatest disquiet just now. On the one hand we have those who urge its rigid enforcement, while on the other are those who say with Prof. Babington, “I think that we are going too far in enforcing the rule of priority in nomenclature as it is now attempted.” (*Jour. Bot.*, Dec., 1888.)

Then there is the question as to the citation of the authority in case of a removal of a species from one genus to another. Shall we cite Linnaeus still in case we remove one of his species into a genus which he may not even have known? If we do, we make him (say those of one party) say what he never said, while to cite as the authority the name of the author of the combination makes us lose sight of Linnaeus as the originator of the specific name and the describer of the species. Upon this we merely inquire now whether we are to consider primarily the men who *have worked* in systematic botany, or the men who are working now and who will work after we are gone. Is all this matter of the citation of authorities for the purpose of “doing justice” to men, or for conducing to scientific accuracy? Do botanists think more of the “glory” of the individual, or the advancement of the science? We shall return to this ere long.—*Charles E. Bessey.*

BOTANY IN ST. LOUIS.—The recent reception of a volume of the Transactions of the Academy of Science of St. Louis (Vol. V., Nos. 1 and 2) reminds us of the work in botany which is being done in this Western city. Of the thirteen papers published, five are botanical, as follows: A Revision of the North American Linaceae, by William Trelease; Description of *Lycoperdon missouriense*, by William Trelease; On the Pollination of *Phlomis tuberosa* L. and the Perforation of Flowers, by L. H. Pammel; Measurements of the Trimorphic Flowers of *Oxalis suksdorfii*, by W. G. Elliott, Jr.; Observations suggested by the preceding paper, by William Trelease.

In the first-mentioned paper twenty-one species of *Linum* are recognized as natives of North America. They are grouped under three tribes, viz.: (1) *Eulinum*, which includes *L. lewisii* Pursh (= *L. perenne* Auct). (2) *Linastrum*, including *L. floridanum* Trelease (*L. virginianum*, var. *Floridanum* Planch). *L. virginianum* L., *L. striatum*, Walt., *L. neo-mexicanum* Greene, *L. kingii* Watson,

L. sulcatum Riddell; *L. rupestre* Engelm., *L. aristatum* Engelm., *L. rigidum* Pursh, and var. *puberulum* Engelm., *L. berlandieri* Hook., *L. multicaule* Hook. (3) Hesperolinon, including *L. digynum* Gray, *L. drymarioides* Curran, *L. adenophyllum* Gray, *L. breweri* Gray, *L. clevelandi* Greene, *L. micranthum* Gray, *L. spergulinum* Gray, *L. californicum* Benth., and var *L. confertum* Gray, *L. congestum* Gray. Two good plates illustrate the fruits, petals, and filaments.

The new *Lycoperdon* (*L. missouriense*) is 3 to 4 inches high and 2 to 4 inches in diameter, narrow below and enlarged and rounded above (*i.e.*, somewhat pear-shaped). Color of interior buff, spores globose, smooth, yellow $2\frac{1}{2}$ – $3\frac{1}{2}$ μ in diameter. It grows in sod under trees.

Mr. Pammel's paper is a valuable one, but too long for a synopsis here, as are also the two remaining ones.

ARBOR DAY LITERATURE.—This annual tree planting day, which has spread from the place of its origin on the Nebraska plains eastward to many of the States, has given rise to a number of books, the latest of which is the neatly bound and printed volume, "Arbor Day," by R. W. Furnas. It makes no pretence to profundity, nor poetry, but gives in sketchy way the history of the tree planting movement in the West, with appeals for the growth of trees for beauty and for profit, and includes lists of those most valuable for various regions, with practical suggestions as to methods. The book is dedicated to and contains a fine portrait of the "author of Arbor Day," Mr. J. Sterling Morton, of Nebraska. It is a pretty and pleasant contribution to the literature of a part of botany too often neglected or ignored by botanists.

ANOTHER SCHOOL BOTANY.—Verily in botany "of making many books there is no end," and if one were obliged to study some of them he might well say with the wise man of old, "Much study is a weariness of the flesh." The last work to claim attention is one with the ambitious title of "Botany for Academies and Colleges, consisting of Plant Development and Structure from Seaweed to Clematis," by Annie Chambers-Ketchum, and brought out by the house of J. B. Lippincott Company, of Philadelphia.

The book is a book of definitions, and often not good ones at that. In the first paragraph we read that "Natural Science treats of all things in nature. Nature is a synonym for the Universe," and paragraph 5, "The plant is the vital link between the mineral and the animal. Plants feed on minerals and digest them into organic food." The style is sometimes rather lively, as, for example, in a note on zoospores (p. 7), "These little creatures are very social; they dance among themselves, circling merrily, but never jostling; no human dancers could be more polite; then when the heyday of youth is over, they withdraw their ciliæ (*sic*), produce an outer wall, send out root-like projections, and develop into staid mother plants"!!

In her attempt to make matters plain the author uses some odd terms, as "Virgin-parentage," "The Man's House," "The Woman's House," etc.

The second part of the book consists of a manual which is said to include "All the known orders with their representative genera." In this the Algæ constitute the first order, the Fungi the second, and the Lichens the third!

Without question the book cost the author a great deal of hard work, and it is a pity that it has been such a waste of energy.—*Charles E. Bessey.*

A VALUABLE BOOK FOR THE HERBARIUM.—Indispensable as Bentham and Hooker's *Genera Plantarum* is in the herbarium, it is often a troublesome book to handle on account of its great size. When one is obliged to search through the three volumes for some obscure genus the time taken is so much lost from work, and the wear and tear of the book itself from so much use is such as to threaten its early destruction. This is especially the case in those herbaria where advanced students have free access to the books and specimens.

The recently issued *Index Generum Phanerogamarum* by Th. Durand, of Brussels, is intended to take the place of the *Genera Plantarum* for much of the work in the herbarium. The orders and genera have the same sequence as in Bentham and Hooker's work. The mode of treatment may be made out from the following, taken from page 1:

ORDO I. RANUNCULACEÆ.

TRIBUS I. CLEMATIDÆ.

1. *Clematis* L. G. I. 3 et 953.—Sp. descript. ultra 200, a cl. Kunze ad 66 reduct. Orbis. fere tot. reg. temp. et trop.
 Sect. 1. *Viticella* DC., *Viticella* Mörch.
 Sect. 2. *Cheirosia* DC., *Atragene* L., *Cheirosia* et *Viorna* Spach.
 Sect. 3. *Flammula* DC., *Meclatic* Spach.
2. *Naravella* DC. G. I. 4.—Sp. 2 v. 3, Asia trop.

The first column of figures consists of a running enumeration of the genera which extends throughout the volume, the second column enumerates the genera of the orders merely.

In the prefatory conspectus the following table is given, showing the number of species (estimated) for the Phanerogams:

		Ordines.	Genera.	Species.
Dicotyledones	{ Polypetalæ	90	3,050	28,300
	{ Gamopetalæ	46	2,885	37,800
	{ Monochlamydeæ	36	849	12,100
		—	—	—
Monocotyledones		172	6,784	78,200
		35	1,587	19,600
	Gymnospermæ	3	46	2,420
		—	—	—
Summa		210	8,417	100,220

The book is published in Berlin by the brothers Borntraeger, at about 20 marks.—*Charles E. Bessey.*